



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

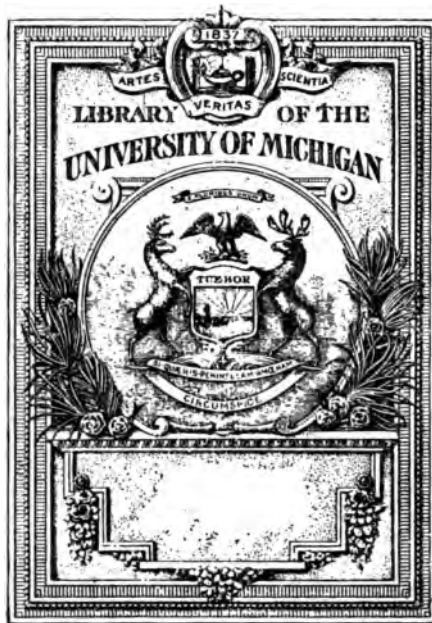
LB

3221

S913s

A 443665

Strayer. Score card for village and rural school buildings



Eleventh Series, No. 9

January 3, 1920

Teachers College Bulletin



SCORE CARD FOR VILLAGE AND RURAL SCHOOL BUILDINGS OF FOUR TEACHERS OR LESS

BY

G. D. STRAYER

PROFESSOR OF EDUCATIONAL ADMINISTRATION
TEACHERS COLLEGE, COLUMBIA UNIVERSITY

AND

N. L. ENGELHARDT

ASSOCIATE PROFESSOR OF EDUCATIONAL ADMINISTRATION
TEACHERS COLLEGE, COLUMBIA UNIVERSITY

PRICE, 35 CENTS

Published by
Teachers College, Columbia University
525 West 120th Street
New York City



TEACHERS COLLEGE BULLETIN

Published fortnightly from September to May, inclusive. Entered as second-class matter January 15, 1910, at the Post Office, New York, N. Y., under Act of August 24, 1912.

Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized.

7 v. 1
8850
Educ. Cat. as sup.
6-30-1923

371.62

S913s

SCORE CARD FOR VILLAGE AND RURAL SCHOOL BUILDINGS OF FOUR TEACHERS OR LESS

This score card has been developed after the plan followed for the Strayer and Engelhardt Score Card for City School Buildings published by this bureau. The major items of the city school building score card have also been used here. These major items are Site, Building, Service Systems, Classrooms and Special Rooms.

In dividing among the sub-items the total number of points allotted to the ideal school situation, the judgments of about 250 judges have been utilized. The median judgment of this group was used in each instance as the basis for determining the number of points to be allotted to any of the subdivisions on the score card.

A thorough knowledge of the standards which are presented on pages 9 to 22 of this pamphlet is a prerequisite to a proper use of the score card. After these standards have been thoroughly studied, visits to buildings under the guidance of a competent student of rural school problems would add greatly in training persons to use this method of measurement of the school plant.

Pages 5 to 7 should be utilized in the survey of the school plant preliminary to the actual scoring. On page 7, it will be found profitable to draw a complete outline showing the details of floor plans and of grounds. The score card itself is presented on page 8.* In using this score sheet, judges, when actually examining the building, will score in the first blank column on the minor subdivisions of the score card. The details for these minor subdivisions may subsequently be carried forward into the second and third columns in order to secure the total scores for each of the major subdivisions and the total score for the building itself.

For one familiar with school buildings and with the score card, much would be gained by checking over blueprints and specifications in the light of the score card before beginning

* Pages 5 to 8 are a facsimile, reduced, of the Score Card for Rural School Buildings. The score card may be obtained from the Bureau of Publications, Teachers College, New York City.

the construction of a building. Here again, the value is in large measure to be found in the fact that each of the more important items will be brought to the attention of the one who seeks to criticise the plans and specifications, and their relative importance will at least in some measure be indicated.

It will be found particularly worth while to score old buildings, in order to call attention to the necessity for reconstruction which is always to be found in buildings which have been in use over a considerable number of years. As one studies the problem of school buildings in the United States, he is impressed by the accidental or occasional repair or reconstruction which is provided. A careful study and scoring of these buildings will often indicate common deficiencies of very great importance which should receive immediate attention, and others which are of relatively less significance which may be postponed for a time.

In the case of scoring school buildings, as with any other instrument of measurement, the result should suggest problems, and in some measure indicate the direction in which reforms are to be brought about. Any person using the score card should supplement the mere scoring of the several items with a report upon any notable deficiency which renders the building unfit for use. It is entirely conceivable that a building on most counts might stand high, but in some one particular, say, with respect to fire protection or sanitation, might rate extremely low. In this case, the notation after the building was scored would call attention to the fact that measures should be taken immediately to remedy particular defects, in which case the building would, possibly with a minimum of expense, be brought up to a very high standard of excellency.

RURAL SCORE CARD
1929Published by BUREAU OF PUBLICATIONS
TEACHERS COLLEGE, NEW YORK CITYSCORE CARD OF VILLAGE OR RURAL SCHOOL BUILDINGS
OF FOUR TEACHERS OR LESSBy
GEORGE D. STRAYER and N. L. ENGELHARDT
Teachers College, Columbia University

This score card may be utilized in judging existing school buildings and grounds or in rating the plans of proposed school buildings. A distinct advantage accrues from the use of the score card in that it fixes attention upon all the details of the building. The total score is the composite of the scores on all the individual items. The score card should only be used in conjunction with the bulletin which outlines the building standards which have been determined upon by the authors. The score on any subdivision is based on conditions found as contrasted with these standards. The score card may be used in making building surveys of school systems or as a filing record.

Name of School _____ District _____ Village _____ State _____

Date _____ Scorer _____

ENROLLMENT FOR A 5-YEAR PERIOD					AVERAGE DAILY ATTENDANCE FOR A 5-YEAR PERIOD				
Year									
Boys									
Girls									
Total									

	Original	First Addition	Second Addition	Total
Cost of Site	\$	\$	\$	\$
Length of Site	ft.	ft.	ft.	ft.
Width of Site	ft.	ft.	ft.	ft.
Area of Site	sq. ft.	sq. ft.	sq. ft.	sq. ft.
Cost of Building	\$	\$	\$	\$
Year of Construction				
Length of Building	ft.	ft.	ft.	ft.
Width of Building	ft.	ft.	ft.	ft.
Area Occupied by Building	sq. ft.	sq. ft.	sq. ft.	sq. ft.
Chief Material Used				
Number of Stories				
Length of Playground	ft.	ft.	ft.	ft.
Width of Playground	ft.	ft.	ft.	ft.
Area of Playground	sq. ft.	sq. ft.	sq. ft.	sq. ft.

Accessibility:

Percentage of patrons residing within 1 mile radius _____ From 1-2 mile radius _____ From 2-3 mile radius _____ Above 3 miles from school _____

PERCENTAGE OF SITE USED FOR:

Lawns and Landscapes	Buildings	Recreation	Gardening	Total
%	%	%	%	%

Name the kinds of playground apparatus and number of each _____

List the attractive features of the environment _____

the unattractive and unsanitary features _____

Travel: Distance from nearest rural school _____; second nearest rural school _____; third nearest rural school _____; from nearest village school _____

Site evidences of general character of community, covering Buildings and Improvement _____

Highways _____ Productivity _____

Progressive methods _____

Fire Protection: List the rooms in which any of the following fire apparatus is found: Fire extinguishers _____

Date of last filling of fire extinguishers _____ Fire hose _____ Automatic sprinkler _____

Is building fireproof _____; basement isolated from first floor _____; basement ceiling fireproof _____; heating apparatus in fireproof enclosure _____ combustible and inflammable material stored in building _____

[illegible]

DETAILS OF THE CLASSROOMS AND SPECIAL ROOMS

1. Room										1. Room									
2. Grade										26. Width of mullions—Inches									
3. Pupil capacity										27. Distance—1st window-front wall									
4. Pupil enrollment										28. Height of windows from floor									
5. Dimensions Length, ft.										29. Height of windows from desk tops									
6. Width, ft.										30. Distance—window top to ceiling									
7. Height, ft.										31. Finish of wall									
8. Floor area, sq. ft.										32. Color of wall									
9. Area per child of pupil capacity										33. Type of blackboard									
10. Area per child of enrollment										34. Height blackboards from floor									
11. Area per child, 40 in class										35. Window shades—Type									
12. Total cubical contents, cu. ft.										36. —Color									
13. Cu. ft. per child of pupil capacity										37. Book closet									
14. Cu. ft. per child of enrollment										38. No. adjustable desks									
15. Cu. ft. per child, 40 in class										39. No. non-adjustable desks									
16. Number of windows, front										40. No. sizes non-adjustable desks									
17. left										41. Kind of teacher's desk									
18. rear										42. Check rooms having clocks (✓)									
19. right										43. Check rooms having fire extinguishers									
20. No. of windows size x										44. Check rooms having artificial light									
21. x										45. Check rooms having thermometer									
22. y										46. List other equipment here									
23. z																			
24. Window glass area-sq. ft.																			
25. Ratio window area to floor area																			

Draw a plan of the school grounds and a floor plan for each floor of building. Name all rooms on floor plans. Indicate doors by "d", windows by "w", stove by "s", heater by "h", teacher's desk by "td", blackboards by "bl", etc. Locate all buildings and appurtenances according to code. Indicate scale.

Scale.....feet = $\frac{1}{4}$ inch. Code: 1 = flagpole. 2 = well or pump. 3 = fuel shed. 4 = girls' toilet. 5 = boys' toilet. 6 = Horseshed. Name environment of school grounds, such as forest, swamp, field, barns, lawns, etc.

SCORE CARD FOR RURAL SCHOOL BUILDING

Score of Building

	1	2	3		1	2	3
I. Site			160	E. Schedule and Emergency Equipment		20	
A. Location		65		1. Clock	5		
1. Accessibility	30			2. Bell	5		
2. Environment	35			3. Telephone	5		
B. Drainage		40		4. First Aid	5		
1. Elevation	20			F. Water Supply System		50	
2. Nature of Soil	20			1. Drinking	20		
C. Size, Form and Use	45	45		2. Washing	15		
D. Flagpole	10	10		3. Bathing	5		
II. BUILDING			200	4. Hot and Cold	10		
A. Placement		40		G. Toilet Systems		60	
1. Orientation	25			1. Placement	15		
2. Position on Site	15			2. Fixtures	10		
B. Gross Structure		90		3. Adequacy	10		
1. Type	20			4. Seclusion, Sanitation and Condition	25		
2. Material	10			IV. CLASS ROOMS			225
3. Height	10			A. Arrangement	10	10	
4. Roof	5			B. Construction and Finish		80	
5. Foundation	10			1. Size	20		
6. Walls	10			2. Shape	15		
7. Entrances	10			3. Floors	10		
8. Aesthetic Balance	5			4. Walls	5		
9. Condition	10			5. Doors	5		
C. Internal Structure		70		6. Closets	5		
1. Stairways and Corridors	25			7. Blackboards and Bulletin Boards	15		
2. Basement	30			8. Color Scheme	5		
3. Color Scheme	10			C. Illumination		60	
4. Attic	5			1. Glass Area	30		
III. SERVICE SYSTEMS			250	2. Window Placement	20		
A. Heating and Ventilation		55		3. Shades	10		
1. Kind	20			D. Cloakrooms and Wardrobes	20	20	
2. Installation and Distribution	10			E. Equipment		55	
3. Air Supply	15			1. Seats and Desks	30		
4. Fans and Motors	5			2. Teachers' Desks	5		
5. Temperature Control	5			3. Other Equipment	20		
B. Fire Protection		20		V. SPECIAL ROOMS			165
1. Apparatus	5			A. Rooms for General Use		80	
2. Fireproofness	5			1. Play Room	20		
3. Exits	5			2. Community Room	30		
4. Light Installation	5			3. Library	20		
C. Cleaning System		25		4. Lunch Room	10		
1. Kind and Equipment	10			B. Officials' Consultation Room	20	20	
2. Efficiency	15			C. Other Special Service Rooms		65	
D. Artificial Lighting		20		1. Industrial Arts	30		
1. Gas or Electricity	5			2. Household Arts	30		
2. Outlets and Fixtures	10			3. Fuel Room	5		
3. Illumination	5			Totals	1000	1000	1000

Instructions for Using Card — (1) Basis for Scoring: 1000 points. (2) For scoring three columns are allowed. While actually at work on a building only the first need be filled out, the second and third to be filled out at leisure. (3) Where credit is allowed for any single item not present and not needed in a building draw a circle around such credit. All scores should be recorded on the basis of the standards outlined in the bulletin, The Strayer-Engelhardt Score Card for Rural School Buildings, Bureau of Publications, Teachers College, Columbia University, N. Y.

STANDARDS FOR VILLAGE AND RURAL SCHOOL BUILDINGS OF FOUR TEACHERS AND LESS

I. SITE

A. LOCATION :

1. Accessibility :

- a. Location near intersecting main highways if possible.
- b. Centrality (present and future) desirable, but not more than 2 miles from farthest home served unless transportation at public expense is provided.

2. Environment :

- a. Sanitary and healthful—not adjacent to farm houses, barns, stock pens, open ditches, swamps, ponds, or dense woods.
- b. Free from disturbance by noise or mal-odors of railroad trains, mills, factories, and the like.
- c. If located in village, should not be near business center, thus avoiding disturbing influence of picture shows, candy shops, village loafers, and street activities.
- d. Free from dangerous cliffs, deep or swift-running stream, or other elements likely to make for unnecessary hazard to children when not under direct supervision.
- e. Pleasing, natural landscape, with trees, hedges, flowers, gardens, green lawns, artistic walks, and fences.
- f. Not unduly exposed to winter winds, storms, and floods.

B. DRAINAGE :

1. Elevation :

- a. Natural elevation preferred—slope away from building.
- b. Site should be underdrained with tile whenever necessary.

2. Nature of soil :

- a. Quick drying, sandy loam, fertile and well adapted to vegetation.
- b. Section devoted to playground should drain quickly and have finished surface of finely crushed stone or gravel.

C. SIZE, FORM, AND USE :

1. Size: A minimum space of four acres, thus providing space for adequate playgrounds, athletic field, school garden, and pleasing location of building.
2. Form: Should be rectangular in shape, approximately 300 ft. by 550 ft., allowing for location of building on end or corner with well adapted space for playgrounds and garden.
3. Grounds should have modern play apparatus, athletic field, and school garden.

D. FLAG POLE:

Preferably on grounds in front of building—pole higher than building.

II. BUILDING

A. PLACEMENT:

1. Orientation: Light exposure of classrooms should be, in order of preference, *southeast, east, southwest, west*. Classrooms should not have full north or south light exposure.
2. Position on site:
 - a. Maximum artistic effect.
 - b. Greatest possible utilization of grounds for play and gardening purposes.
 - c. Should allow for future additions and expansion of plant.

B. GROSS STRUCTURES:

1. Cottage type; three or four teacher buildings can be planned in T, E, or U type to advantage, thus allowing for easy additions.
2. Materials: hardburned brick, concrete, hollow tile stuccoed, or stone. Wood, if constructed along lines of modern fire-resistive methods.
3. Height: one story above basement. No one to four teacher building will be approved if more than one story in height.
4. Roof:
 - a. Sloping of asbestos shingle, slate, or tile, waterproof, properly sloped for drainage.
 - b. Provided with eave gutters and leaders emptying into cistern connections or other outlets.
 - c. Metal guards near eaves to prevent snow slides.
5. Foundation:
 - a. Concrete or masonry walls with wide footing.
 - b. Should extend below maximum freezing line.
 - c. Wall inclosing basement should be made waterproof and dampproof.
6. Walls:
 - a. Walls of hard brick laid in cement mortar, reinforced concrete, masonry, hollow tile, or wood.
 - b. Outer walls of masonry buildings should be furred.
 - c. If built of wood, fire stops of metal, asbestos, or brick should be inserted to prevent rapid spread of fire through building.

7. Entrances:

a. Number:

- (1) One or two teacher building, one or more entrances, 6 to 8 feet in width with porch reached by concrete steps, 6 inch risers, 12 inch non-slip treads.
- (2) Three and four teacher building should have at least two entrances.
- (3) Outside entrance to heating system if located in basement.
- (4) Community room, if located in basement, should have convenient outside entrance allowing use of room during school hours without disturbing school activities.

b. All entrances should be kept free from outside obstructions.

c. Doors:

- (1) Two pairs of double doors, opening outward, substantial but not so heavy as to be out of proportion to the strength of small children who will open them.
- (2) Should be provided with panic bolts, checks, and provision for holding open.
- (3) Size—3 x 7½ to 8 feet.

8. Aesthetic balance:

- a. The building should be symmetrical and pleasing in effect.
- b. All ornamentation not contributing to strength or utility should be avoided.
- c. Should vary in design from other buildings in same vicinity but set a standard of good taste.

9. Condition:

The building should be well painted and kept free from defacements and demarkations.

C. INTERNAL STRUCTURE:

1. Stairways, vestibules, and corridors:

a. Basement stairways:

- (1) Constructed of fireproof material.
- (2) Width—4½ to 5 feet, 12 inch treads, 6 inch risers.
- (3) Landings: should equal in width the length of the treads.
- (4) Lighting: natural as well as artificial light should be provided in adequate amount.
- (5) No storage rooms should be located under stairways.
- (6) When leading to basement containing heating apparatus should be closed off at base by fireproof doors.

- (7) Sanitation: where angles and corners would otherwise occur in stairway construction, the plans should provide for concaved surfaces (coves), thus preventing the accumulation of dust, dirt and germ-carrying filth in places inaccessible to brooms and brushes.
- b. Vestibules:
 - (1) 8 to 12 feet wide.
 - (2) So arranged as to serve as storm door entrance preventing cold drafts of air from entering school room or corridor when outer doors are opened. Should not be used as cloakroom.
 - (3) Metal foot scraper mat flush with floor in vestibule.
- c. Corridors—essential to any 3 and 4 teacher building plan.
 - (1) Should provide easy access to classrooms and exits with least possibility of congestion.
 - (2) Construction:
 - (a) Material—hard maple or hard pine or battleship linoleum glued on wood floors. Cement overlaid with battleship linoleum preferred.
 - (b) Width—7 to 10 feet.
 - (c) Doors—all classroom and special room doors should open into corridor, glazed in upper portion.
 - (d) Lighting—adequate natural light, sunshine if possible, with provision for artificial lighting.
 - (e) Heating—should be as well heated as other parts of building, provisions being made for warming feet and drying wet and damp clothing.
 - (f) Sanitation—all intersecting surfaces should show cove finish, preventing accumulation of dust and dirt. Dirt catching ledges should be avoided.
 - (3) Should be free from projections or obstructions. Pleasing effect—should be made attractive by furnishing with pictures, friezes, busts, plants, and the like.
2. Basement:
 - a. Depth below grade—except for heating plant and fuel room, basement should not extend more than $3\frac{1}{2}$ feet below grade.
 - b. Heating plant and fuel room should be separated from rest of basement by fireproof masonry walls and fireproof ceiling with self-closing fire doors.

- c. Floors and walls should be damp-proof.
- 3. Color scheme: (See Classrooms.)
- 4. Roof space — properly ventilated.

III. SERVICE SYSTEMS

A. HEATING AND VENTILATING:

The systems of heating and ventilating are here defined with a compound name—the first part of which designates the heating system and the second part the ventilating system.

DEFINITIONS

1. The "*Furnace-Gravity*" system includes the following:
 - a. Ventilating room heaters. These shall be located on the same floor with the room or rooms to be heated, but in separate compartments adjacent to these rooms; or
 - b. Hot air furnace located in the basement and below the room or rooms to be heated.Both appliances (a) and (b) take the air from out of doors and deliver warm air to the rooms without the use of mechanical devices. Ducts or flues of proper size are provided. The air, in sufficient volume to ventilate the rooms, is heated to a temperature adequate to maintain the standards set up in these requirements. In addition, there is provided a corresponding gravity exhaust system, which withdraws vitiated air from the rooms and discharges it out of doors. The discharge may be effected with or without acceleration by means of an added source of heat.
2. The "*Direct-Natural*" system shall mean an equipment including direct radiators under the windows for heating the room and properly designed deflecting ventilators for the windows. These ventilators will allow the natural admission of the air from out of doors. A system of exhaust ventilation for the removal of vitiated air in the required volume, through specially located outlets in the room, is included. The following rules should be followed:
 - a. This system should not be used in assembly rooms.
 - b. It should be used only in connection with a steam atmospheric vapor system of heating, with graduating control valves on the radiators.
 - c. The radiators shall extend the full width of all windows. All windows shall be used for the admission of air to the room. Radiators shall contain not less than twice the radiating surface otherwise necessary to maintain the standard room temperature.
 - d. Window deflecting ventilators, not less than twelve (12) inches high, should be placed on the sill and extend the full width of each window. They should be of such construction as to insure effective deflection and diffusion of the air without objectionable drafts.
 - e. Vitiated air should be taken from each room through one or more openings located near the floor in the wall on the side of the room opposite from the window ventilators. If no accelerating heaters are placed in

the exhaust flues, at least two such openings should be provided in each schoolroom. These openings should be spaced not less than eight (8) feet apart, center to center. Each opening should connect with an independent exhaust flue extending through the roof. The combined areas of such flues should be not less than one (1) square foot for each five occupants of the room. Each flue should be provided with a shut-off damper. For a mechanical exhaust, or for a gravity exhaust system having accelerating heaters in the flues, a single exhaust opening and flue for each room may be provided. This single opening should be located as above required.

3. The "*Direct-Gravity*" system includes:
 - a. Direct radiators located within the rooms to be heated; and
 - b. Indirect radiators, in suitable casings, located below the rooms to be ventilated.

The air is taken from out of doors over the indirect radiators and delivered to the rooms in sufficient volume and at approximately the required room temperature, without the direct use of mechanical means. Ducts and flues of proper size are used for the delivery of air. Approved mechanical means should be provided for auxiliary use when necessary. A corresponding gravity exhaust system, which withdraws the vitiated air from the rooms and discharges it out of doors, should be installed. This exhaust system may be installed with or without acceleration by means of an added source of heat.

4. The "*Direct-Mechanical*" system includes the following:
 - a. The "split system," providing both direct radiators located within the rooms to be heated, and a forced air supply for classrooms, study rooms, and the like. The forced air supply system consists of a mechanically operated fan or blower, which takes the air from out of doors and draws or forces it through suitably enclosed air heaters. At these heaters it is warmed to approximately room temperature and thence delivered to the rooms through properly proportioned ducts or flues.
 - b. A "unit system," which includes in each room one or more ventilating units which are located under the windows and which contain electrically operated twin multi-blade fans, drawing the air directly from out of doors and delivering it to the room in the required volume. The ventilating unit also contains extended surface steam radiators for heating the air to the required temperature.

In connection with either of the above systems a corresponding mechanical or gravity exhaust system is installed. This exhaust system withdraws the vitiated air directly from the rooms and discharges it out of doors. The discharge may be effected with or without acceleration by means of an added source of heat.

5. The "*Indirect-Mechanical*" system permits of no direct radiators within the school rooms, but provides for both the heating and ventilation of school rooms to

the required standard by means of a forced system of air supply. A mechanically operated fan or blower is employed which takes the air from out of doors and draws or forces it through suitably enclosed steam or hot water indirect radiators or through hot air furnaces. When* thus warmed to a sufficient temperature, the air is delivered to the classrooms through properly proportioned ducts or flues. A corresponding mechanical or gravity exhaust system for classrooms, study rooms, and the like, is used. This system provides for the withdrawal of the vitiated air from the rooms and its discharge out of doors. This system may be installed with or without acceleration by means of an added source of heat. The indirect mechanical system requires, in addition, direct radiators sufficient to heat all rooms where water is provided and also direct radiators at all entrances.

6 The "*Direct-Indirect*" system:

The so-called "direct-indirect" system of heating and ventilation should not be used in any school room. By "direct-indirect" is meant the introduction of air at the base, or upon any part, of a "direct" radiator without the use of a fan as provided in the "unit system."

1. Kinds of systems acceptable:

- a. One and Two Teacher Schools: The "Furnace-Gravity" system, using either ventilating room heaters or hot air furnaces, is the standard; other systems, or approved combination thereof, may be used.
- b. Three and Four Teacher Schools: The "Furnace-Gravity" system, using hot air furnace only, is the standard; other systems, or approved combination thereof, may be used.

2. Installation and distribution:

a. Ventilating room heaters:

- (1) Should not be installed in any school building containing more than twenty thousand (20,000) cubic feet of space to be heated. No single heater should serve more than ten thousand (10,000) cubic feet of space.
- (2) Approved vertical pattern, having insulated sheet metal shield entirely surrounding the heater. The shield should be not less than six (6) inches distant from the radiating surface of the heater. The bottom of the shield should be not more than fourteen (14) inches or less than eight (8) inches distant from the floor.

- (3) Provided with approved water evaporating pan located within the shield, preferably on the heater.
- (4) Computed for size on the basis of:
 - (a) Total heat necessary for heating building and warming the air for ventilation as required.
 - (b) The heating value of fuel.
 - (c) The rate of combustion.
 - (d) The combined efficiency of furnace and grate.
The heating surfaces and grate area of the heater shall be such that its rated and required capacity may be obtained without forcing under any conditions of service.
- (5) Provided with an approved exhaust or vitiated air flue located in the same end of the room as the heater, and not less than four (4) feet distant therefrom. This flue should conform to either of the following standards:
 - (a) When exhaust air is taken out through the smoke flue the flue should be not less than sixteen by sixteen (16 x 16) inches clear on the inside throughout its entire length. The flue should be provided with an approved mixing chamber which should insure a maximum ventilation of the room, together with a complete exhaust of the waste products of combustion.
 - (b) When the exhaust air flue is separate from the smoke flue it should be constructed of double brick walls and should be not less than twenty by twenty (20 x 20) inches from the floor inside throughout its entire length. The smoke flue which should be located in the center of the exhaust flue should not be less than eight (8) inches in diameter and constructed of iron of not less than 12 U. S. gauge metal. Double flue chimneys, in which it is proposed to use one flue for smoke and the other flue for exhaust air, are not acceptable. Exhaust air connections from rooms should be near the base of the exhaust flue. Every such room opening should be fitted with a wall grille or register and a shut-off damper or equivalent device. Floor registers do not meet the standard.

b. Hot air furnaces:

- (1) Should be of approved design, having fire pot and radiator entirely surrounded by insulated sheet metal casing or masonry enclosure. This enclosure should be so arranged that no perceptible resistance is encountered by the air in passing to the warm air leaders.
- (2) Should be provided with approved water evaporating pan located within the casing, preferably near the top.
- (3) Should be computed for size on same basis as specified for *ventilating room heaters*.

3. Air supply:

- a. Supply 1800 to 2000 cubic feet of air per hour to each child in classroom.
- b. Maintain temperature of 65 to 68 degrees F. on coldest days without recirculation of air.
- c. Air must be kept in motion in all parts of the room allowing no dead air pockets to exist.
- d. Supply air at relative humidity of from 40 to 50.
- e. Humidification—steam jets or vaporization by means of trays or tanks of heated water in contact with air to be circulated.
- f. Recirculation of air not permitted while children are in building unless passed through air washer.

B. FIRE PROTECTION SYSTEM:

1. Apparatus—Small hand fire extinguishers easily accessible from any part of building. Should be two in each work room and one near heating plant.
2. Fireproofness—Desirable from standpoint of security and durability of structure. Not essential to safety of occupants if exits are well planned. Door leading to furnace room should be fireproof and self-closing. Furnace room should be fireproof.
3. Exits—No part of building, including basement, should be without direct and unobstructed passage to outside of building.
4. Light installation—Electric wiring and lighting fixtures installed in accordance with the latest rules of the National Board of Fire Underwriters. Inspection and certificate of approval by underwriters required. Acetylene gas or gasoline tanks should be located below surface at safe distance from building with connections that meet underwriters' standards.

Note: For standards of steam, hot water boilers, radiators, etc., consult the Strayer-Engelhardt Score Card for City School Buildings, published by the Bureau of Publications, Teachers College, Columbia University, New York City.

C. CLEANING SYSTEM:

1. Kind and equipment — Oil brushes, cleaning compound, and dust cloths. Corn brooms and feather dusters should not be used for cleaning purposes. Portable vacuum cleaner, with suitable appliances, will be found desirable for the three and four-teacher buildings. Electric generator for cleaning, where no public service electric supply exists, is desirable.
2. Efficiency — All parts of building and equipment should be neat and sanitary. All cleaning should be done outside of school hours.

D. ARTIFICIAL LIGHTING SYSTEMS:

1. Kind — Electricity or gas. Electric generator for light, where no public electric service exists, should be provided.
2. Outlets and fixtures — 6 to 9 per classroom; special attention should be paid to lighting of auditorium or community room.
3. Standard illumination — 9 foot candles at each desk with no glare, shadows, or light in direct line of vision.

E. SCHEDULE AND EMERGENCY EQUIPMENT:

1. Clock in each classroom.
2. Electric gong desirable. Hand bell or belfry signals allowable as substitutes.
3. Telephone connection with community telephone system.
4. First-aid case with complete emergency equipment available in case of minor accidents.

F. WATER SUPPLY SYSTEM:

Source of water: community water system or deep drilled, bored, or driven wells precluding possibility of surface drainage or contamination. Dug wells or springs not acceptable.

(a) Building should be equipped with pressure tank, gasoline, or motor-driven pump and complete water supply piping and fixtures.

(b) Water periodically tested.

1. Drinking:
 - a. One automatic bubbling fountain, of type preventing mouth coming in contact with bubbler, for each fifty pupils.
 - b. Should be located in corridor with provision for easy use by small children.
 - c. Drinking facilities should never be placed in toilet rooms.
 - d. Individual drinking cups required where drinking fountains are not installed.

2. Washing:

Wash bowls adapted to height of children in toilet rooms. Officials' consultation room and work rooms should have washbowls where possible.

Sinks—should be located in work rooms, basement and janitor's closet.

3. Bathing:

Provision for shower baths. Individual shower stalls and adjoining dressing stall with canvas curtain should be provided for girls. Heads of showers located on angle and at sides of shower compartment. Separate valves for hot and cold water.

4. Hot and cold water should be supplied to above washing facilities. Hot water heater separate from heating plant. Soap and towels—liquid soap and paper towels should be furnished.**G. TOILET SYSTEM:****1. All toilets should be placed inside of building on same floor as classrooms. Separate toilets should be provided for teachers.****2. Fixtures:**

a. Porcelain seats of open type with individual flush. Height adapted to children.

b. Boys' individual urinals of porcelain (non-absorbent and easily cleaned).


3. Sewage disposal plant with septic tank and filtration field or chemical toilet or sewer connection.**4. Adequacy—one seat for each 25 boys or fraction thereof; one urinal for each 15 boys. One seat for each 15 girls.****5. Seclusion, sanitation, and condition:**

a. Seclusion—Non-communicating, soundproof walls between adjoining rooms provided for the two sexes. Entrances to toilet rooms should be well screened. Stalls with light swinging doors for each seat.

b. Sanitation and condition—Light, airy rooms; sunshine desirable. Separate duct for ventilating purposes; exposed plumbing, non-absorbed floors and walls. All interior walls finished in moisture-proof cement painted white, capable of being washed. No demarcations or defacements should be permitted to remain in any toilet rooms.

IV. CLASSROOMS**A. ARRANGEMENT:**

Easy of access to exits. Minimum of congestion in passing to and from rooms.



B. CONSTRUCTION AND FINISH:**1. Size:**

- a. 18 square feet of floor space and 200 cubic feet of air space per pupil as minima.
- b. 22' x 28' x 12' seating 30 pupils.
24' x 32' x 12' seating 40 pupils.

2. Rectangular—seated on the long axis.**3. Floors—**Hard wood or wood overlaid with battleship linoleum.**4. Walls and ceiling:** standard—hard, smooth, non-gloss finish plaster. Picture mold and wall space for pictures, maps, and the like.**5. Doors—**substantial but not heavy, 3 feet x 7 feet, opening outward. No raised thresholds across door openings.**6. Closets or closed cases—**At least one in each classroom providing space for supplies, books, globes, etc.**7. Blackboards:**

- a. High grade slate 4 feet wide, mounted with firm backing; perfectly butted and shaved joints. Height from floor should vary with age of children. For lower grades 24 inches, upper grades 32 to 36 inches. Should run full length of front wall and wall opposite windows. No blackboard should be placed on window wall.

- b. Bulletin boards—Part of space not utilized for blackboard should be used for cork or burlap display. In one- and two-teacher schools blackboards should be installed at two heights—24 inches and 32 inches.

8. Color scheme—Walls light buff or light gray; ceilings white or very light cream. Woodwork and furniture to harmonize in tone in dull finish.**C. ILLUMINATION:****1. Glass area** equal to $1/5$ to $1/4$ of floor area.

2. Window placement—Unilateral from pupils' left, banked as closely as construction will permit, extending from rear of room to within 7 feet of front wall. Sill of window should be from 3 to 4 feet from floor and top should be as near ceiling as possible. Mullions should not exceed ten inches in width.

Optional: Counterbalance windows may be found desirable.

3. Shades—Double mounted at center of window or adjustable, one pulling each way; light tan or straw color; in good condition and repair.

D. CLOAKROOMS AND WARDROBES:

Should provide ample space for winter wraps for full capacity of classrooms. Rack for umbrellas. Cloakrooms should be separate from corridors and class-

